

Saratoga County Airport

AIRPORT MASTER PLAN UPDATE

DRAFT CHAPTER 3 FORECAST OF AVIATION ACTIVITY

Prepared for:

SARATOGA COUNTY DEPARTMENT OF PUBLIC WORKS



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Chapter 3

Forecast of Aviation Activity

3.0. INTRODUCTION

Forecasts of aviation activity at Saratoga County Airport are a key element in the Airport's future planning as they are used as the basis for the demand/capacity and facility requirements analyses that identify Airport development needs. The two major elements of this Chapter are the forecasts of aviation activity and the selection of a design aircraft for the Airport. Aviation activity refers to the annual level of aircraft operations, which includes takeoffs and landings. The design aircraft is the most demanding aircraft, or family of aircraft, in terms of approach speed and wingspan that is anticipated to use the Airport on a regular basis, which the FAA defines as at least 500 annual operations. Together, approach speed and wingspan provide a basis for determining the type and size of aviation facility development, and serve as a platform upon which this Master Plan is based.

The base year of the aviation demand forecasts for Saratoga County Airport is 2012, which represents the last full year of data available from the Airport. The aviation demand forecasts were developed for a twenty-year planning horizon and segregated into the short term (0-5 years), mid-term (6 to 10 years), and long term (11 to 20 years). The forecasts allow the Airport Sponsor to set a time line for development based on expected changes in aviation and airport demand. If future demand does not match the projection time frame, development implementation may be modified to fit the changing demand pattern.

The forecasts presented in this Chapter are unconstrained, that is, they assume that adequate airside and landside facilities will be in place to accommodate the forecast activity levels. Projected activity levels may not be achieved if adequate facilities are not in place.

Major sections of this Chapter include:

- Unique Aviation Activity
- Historical Data
- Forecasting Methodologies
- Based Aircraft Forecasts
- Aircraft Operations Forecasts
- Design Aircraft

3.1. UNIQUE AVIATION ACTIVITY

Saratoga County Airport has two unique aviation activities that define the aircraft operations at the Airport. The first is the Airport's extensive glider operations generated by the soaring associations located on the airfield. The second unique aspect of activity is the seasonal influx of aircraft associated with the Saratoga Race Course in Saratoga Springs. The following sections summarize these activities and how they were considered in the forecasting effort.



3.1.1. Glider Operations

Glider activity has been increasing at the Airport since the last Master Plan was completed in 2003. Saratoga Soaring Association was the first soaring association to construct a hangar to accommodate their operations. They built their hangar in September of 2003. Adirondack Soaring Association started operating at the Airport within the past few years and constructed a new hangar on the Airport in June of 2012. Both glider associations operate from April until November and occasionally during the winter if conditions permit.

The glider activity is recreational in nature and peaks during weekend days. However, there is a limited amount of training that takes place during the weekdays. The level of activity varies from weekend to weekend depending upon weather conditions and the scheduling of any glider-related functions.

The glider associations provided current information on their activity. Saratoga Soaring has one tow plane and five gliders while Adirondack has three tow planes and 48 gliders. All but 17 gliders are stored in the hangars or on the lease property of each glider association. The glider associations also indicated that there were about 2,500 flights in 2013. A flight consists of four operations, a takeoff of the tow plane and glider and the landing of each aircraft. Based on this assumption, there were about 10,000 operations in 2013.

Glider operations were not included in the forecast given that historical information on glider activity at Saratoga County Airport is not available. Anecdotal information from the glider associations indicated that there has been about a 5% annual growth in activity, however, without the ability to confirm that growth level, developing a forecast is not practical.

Nevertheless, the unique operational requirements of the glider operations at the Airport, coupled with the mixing of powered aircraft and gliders, have generated unique issues at Saratoga County Airport. On the ground, there have been times when powered aircraft are blocked by gliders being towed or waiting to be towed into the air. As the gliders cannot be moved onto the turf areas of the Airport, which is habitat for the Karner Blue Butterfly, powered aircraft had their access to the departure runway delayed.

Operationally, gliders operate primarily on Runway 32 while powered aircraft operate on Runway 23. In these instances, both powered aircraft and gliders operate independently and operational conflicts are minimal. However, when both powered aircraft and gliders operate on Runway 5-23, there have been conflicts as it takes time to get a glider airborne or off the runway after landing. In these cases, powered aircraft may have to abort the landing and re-enter the pattern to land once the gliders have vacated the runway. In other cases, aircraft are delayed when taxiing to Runway 23 on Taxiway D due to gliders being towed to Runway 32 or 23. The glider associations have been effective in minimizing this situation; however, it does occur on occasion. The results of this activity are the reduction in runway capacity and increase time and fuel expenditures.

Given the unique issues discussed above, glider operations will be further assessed in Chapter 4 – Demand Capacity Analysis to determine the overall capacity to accommodate both glider and powered aircraft operations and address the unique



operational requirements of glider operations further in Chapter 5 – Facility Requirements,

3.1.2. Saratoga Race Course Aviation Traffic

The Saratoga Race Course in Saratoga Springs celebrated its 150th anniversary in 2013. The Course attracts people from around the New York Region and elsewhere every year. The track's race season is from Mid July until Labor Day.

During that six-week period, there is a major influx of corporate jet and turboprop activity. July and August accounted for 53% of the annual corporate turboprop and jet activity at the Airport in 2012. Prior years have similar activity levels.

The primary consideration for the forecasting effort is the peak demand generated by this activity and the impacts on aircraft parking. During "Race Season", all of the aprons are used to park transient turboprop and jet aircraft in addition to the based aircraft that are tied down. Many times, the aircraft are parked closer than normal to fit the large numbers of aircraft. To alleviate some of the issue, taxiways have been used to temporarily park aircraft. Activity associated with the race season will be forecasted to identify future peaking characteristics and any additional facilities that may be necessary.

3.2. HISTORICAL DATA

The Airport and aviation activity have changed since the last Master Plan was completed in 2003. This section summarizes how activity has changed and what has influenced those changes. This information provides both quantitative and qualitative information upon which the forecasts of aviation activity will be developed.

The data was compiled from several sources. Socioeconomic data was obtained from the local economic development agency, while baseline and historic activity data was collected from previous planning efforts, including the 1990 and 2003 Master Plans, the 1998 NYSDOT State Aviation System Plan, and FAA Form 5010. Other data sources including flight tracking services were also obtained and used in this forecasting effort.

3.2.1. Regional and Socioeconomic Trends

Socioeconomic data, in addition to aviation industry trends, provides general indicators of demographic and economic change that have been found to coincide with potential demand for general aviation services. In this regard, trends in population, median income, and employment/unemployment levels have the potential to affect aviation demand at Saratoga County Airport. Saratoga County is one of four Counties that make up the Capital District of New York. However, for purposes of this effort, all data for Saratoga County was obtained and presented as the County drives much of the activity of the Airport in terms of based aircraft and operations.

As shown in Table 3-1, three measures of socioeconomic activity in Saratoga County between 1990-2012 (where available) indicate positive growth.



Table 3-1 – Saratoga County Socioeconomic Activity Characteristics

Year	Population	Employment	Median Income
1990	181,276	39,677	\$36,635
2000	200,635	53,651	\$49,460
2010	219,607	61,076	\$65,100
2011	221,081	-	\$67,186
2012	222,133	-	-
Growth Rate	0.9% (1990-2012)	2.2% (1990-2010)	2.9% (1990-2011)

Source: Saratoga County Industrial Development Agency

Information from Saratoga County Economic Development Corporation (SCEDC) identified research and development as one of the major factors changing the economic structure of the region. One example is a new large semi-conductor company, Global Foundries, which established a plant in Malta, south of Saratoga County Airport. The facility is operational and employs over 1,300 people. Discussions with company staff indicated they use Albany County Airport for commercial service needs and Albany and Schenectady County Airports for corporate services.

Other research and development initiatives ongoing in the region include General Electric's Global Research Center and Knolls Atomic Power Laboratory in the Town of Milton (advanced nuclear propulsion technology and technical support for naval reactors). It is expected that combined, research and development will become a larger component of the economic growth of the region that will attract new businesses to the region and may have future implications of additional based aircraft or use of Saratoga County Airport.

This information will be used in quantitative analyses in subsequent sections to identify potential statistical relationships regarding activity at Saratoga County Airport. If such positive correlations exist, some measure of these socioeconomic growth rates will be utilized to direct forecasts for future demand levels at Saratoga County Airport.

3.2.2 Based Aircraft

A based aircraft is defined as an active aircraft that is stored at an airport on a permanent basis, either in a hangar or tied down on an apron. At Saratoga County Airport, the based aircraft fleet mix consists of a wide spectrum of aircraft types. Table 3-2 presents historical based aircraft data for Saratoga County Airport, supplemented by data from the Airport Form 5010, which provides data for 1999 and 2012.

Table 3-2 – Historic Based Aircraft Fleet Mix

Year	SE*	% Total	ME*	% Total	Turbo-Prop	% Total	Jet	% Total	Rotor	% Total	Total
1986	63	97%	1	2%	1	2%	0	-	0	0	65
1999	58	95%	2	3%	1	2%	0	-	0	-	61
2012	39	78%	5	10%	3	6%	2	4%	1	2%	50

Source(s):1986 Data: Saratoga County Airport Master Plan, 1990; 1998; 1999 Data: Airport Master Record/FAA Form 5010, 1999; 2012 Data: Airport Master Record/FAA Form 5010, 2012, North American Flight Services. *SE=Single Engine Aircraft, ME=Multi-Engine Aircraft.



Airport Master Plan Update

As shown in Table 3-2, the number of based aircraft at Saratoga County Airport has decreased over the last 27 years. During this period, the average decrease in based aircraft is -1.0 percent annually.

Changes in total based aircraft activity at Saratoga County Airport between 1999-2012 mirror the periods analyzed for the 2003 AMPU, however with one exception: fleet mix composition. In this regard, the overall decrease from 1986 to 2012 is primarily driven by a nearly 38 percent decrease in based single engine piston aircraft. During this period, based multi-engine and jet aircraft increased from 5 percent to 22 percent of total based aircraft at the Airport. This occurrence continues in spite of four single engine aircraft that relocated to Saratoga County Airport by new employees of Global Foundries during this period. The change in composition of the based aircraft fleet is consistent with national trends where the number of recreational use aircraft (predominantly single engine) is declining while turboprop and jet aircraft favored by business users are increasing.

3.2.3 Aircraft Operations

An aircraft operation is defined as a takeoff or a landing, where each is counted as a separate operation. Operations are further divided into local operations and itinerant operations. A local operation is one where the aircraft departs and returns to the same airport, and flies within 20 miles of the Airport as defined in the FAA Air Traffic Activity Systems (ATADS) glossary. These operations are usually associated with pilot training or recreational flying. An itinerant operation is one where an aircraft is either going to or arriving from another airport.

Activity data for Saratoga County Airport was obtained from the FAA 5010 form and other historical documents including the 1986 and 2003 master plans and the 1995 New York State Airport System Plan. As the airport does not have a control tower, aircraft operations are estimated based on input from the Fixed Base Operator (FBO) and New York State Department of Transportation (NYSDOT). The activity data available for Saratoga County Airport is presented in Table 3-3.

Table 3-3 – Historic Aircraft Operations

Year	Total GA Operations	Itinerant Operations	Local Operations
1986	50,700	N/A	N/A
1995	39,357	N/A	N/A
1999	38,500	17,300	21,200
2012	38,550	16,550	22,000

Source(s): 1986 Data: Saratoga County Airport Master Plan, 1990; 1995 Data: New York State Aviation System Plan, 1998; 1999 Data: Airport Master Record/FAA Form 5010, 1999; 2012 Data: Airport Master Record/FAA Form 5010, 2012

As seen in the table, overall activity is down from 1986; however, the Airport's activity has not changed since 1999. Discussions with the Airport Manager indicated that over the past several years, activity has been relatively stable but has mirrored the national economic trends, decreasing when the economy falters and increasing when the economy is doing well. The Airport Manager's observations, especially for the past several years, are supported by aircraft fuel sales data available from the Airport's aviation fuel supplier.



Fuel sales data for the Airport is presented in Table 3-4.

Table 3-4 – Fuels Sales (Gallons)

Month	2009		2010		2011		2012	
	Avgas	Jet A	Avgas	Jet A	Avgas	Jet A	Avgas	Jet A
January	0	0	0	1,785	3,064	8,155	0	429
February	0	0	0	8,152	0	105	0	8,118
March	8,265	8,101	8,424	180	0	8,128	0	1,000
April	0	8,498	0	8,507	0	8,048	4,050	8,561
May	8,435	8,524	7,928	16,095	8,011	7,996	8,040	8,002
June	0	8,451	0	19,792	4,405	15,907	0	7,585
July	4,972	16,875	7,875	20,580	0	23,872	8,423	32,018
August	8,234	72,823	3,730	64,649	7,952	65,985	8,463	56,633
September	8,269	26,384	4,464	15,910	7,939	24,374	0	8,915
October	0	8,507	8,334	16,382	0	8,503	0	16,666
November	8,565	7,527	0	7,748	0	8,535	8,490	2,293
December	<u>0</u>	<u>8,065</u>	<u>7,624</u>	<u>949</u>	<u>8,006</u>	<u>8,587</u>	<u>0</u>	<u>8,568</u>
Total	46,740	173,755	48,379	180,729	39,377	188,195	37,466	158,788

Source: Avfuels

As shown in Table 3-4, aviation gas (Avgas) used by the piston aircraft grew slightly from 2009 to 2010, and then decreased. Several aircraft relocated to other airports in 2010 and the drop in the number of based aircraft is, in part, reflected in the Avgas fuel sale trends.

Jet A fuel sales increased between 2009 and 2011 and then dropped in 2012. The reason for the 2012 drop is not apparent based on discussion with the Airport Manager; however, general economic conditions are likely to have played a role.

3.2.4 Local and Itinerant Aircraft Split

Aircraft operations are split between the based aircraft and itinerant aircraft using an airport. In the case of Saratoga County Airport, the split between local and itinerant aircraft has not changed significantly according to discussions with the Airport Manager. Though based aircraft generate the greater activity for the airport, the Airport's itinerant activity is strong as well. This is due in part to corporate activity that occurs throughout the year for business purposes and the unique activity associated with "Race Season" in Saratoga that was discussed in Section 3.1.2. Many of these aircraft are corporate jets and turboprop aircraft. Due to the Race Season, the Airport has a higher concentration of itinerant aircraft than a typical General Aviation Airport. Table 3-5 presents the historical local and itinerant split.

Table 3-5 – Historic Split of Aircraft Operations

Year	Total GA Operations	Itinerant Operations	Local Operations
1986	50,700	N/A	N/A
1995	39,357	N/A	N/A
1999	38,500	44.9%	55.1%
2012	38,550	42.9%	57.1%

Source(s): 1986 Data: Saratoga County Airport Master Plan, 1990; 1995 Data: New York State Aviation System Plan, 1998; 1999 Data: Airport Master Record/FAA Form 5010, 1999; 2012 Data: Airport Master Record/FAA Form 5010, 2012

3.3 FORECASTING METHODOLOGIES

Forecasting aviation activity requires the use of various statistical methodologies to generate a projection of activity. For Saratoga County Airport, a series of quantitative methodologies were considered to develop scenarios of future based aircraft and aircraft operations levels. Each scenario was developed utilizing growth rates and factors that could affect future aviation activity at Saratoga County Airport. As will be shown, particular forecasts were also adjusted where appropriate to reflect local knowledge and/or input from the Airport Sponsor and/or the FBO.

The methodologies use forecast data from the FAA, local activity for the airport and local demographic data for the region. The FAA forecasting data used for this analysis included:

- FAA Aviation Forecast Growth Rates
- FAA Terminal Area Forecast (TAF)
- Regional Socioeconomic Growth Rates

The statistical models used to develop forecasts of aviation activity included the following methodologies:

- Time-Series/Trend Line Analysis
- Regression Analysis
- Applied FAA Aerospace Forecast Growth Rates
- Market Share Analysis

These methodologies are further detailed in the next sections.

3.4 ASSUMPTIONS CONSIDERED FOR THE FORECASTING EFFORT

Several assumptions were made regarding the forecasting effort for Saratoga County Airport. The assumptions were as follows:

- The base year for the forecasts was 2012, which is the last full year of data available from the FBO. The FAA data obtained for this effort also had a base year of 2012.
- Information provided by the Airport Manager indicated that there is little movement of based aircraft or aircraft operations among the regional airports including Glens Falls, Schenectady County and Fulton County airports. In the past, based aircraft have relocated to other regional airports or have been attracted to Saratoga County Airport for various reasons including favorable hangar fees, management issues, or other similar



issues. There also has been fuel price competition that has influenced airport activity. However, the Airport Manager indicated that in the past several years, there has been no appreciable loss of based aircraft or reduction in aircraft operations.

- Seventy five percent of the based aircraft are residents of Saratoga County; the remaining 25% are made up of residents from other counties. Further analysis showed that residents outside of Saratoga County were from Towns that were on the boarder of Saratoga County and the adjacent counties. This substantiates information provided by the Airport Manager and indicates that based aircraft are largely influenced by Saratoga County and not the surrounding counties or airports located within these adjacent counties.
- The Airport gained four based aircraft when Global Foundries located a manufacturing plant in the County. It is reasonable to assume that as high tech companies relocate to the region, as intended by the region's marketing efforts, that Saratoga County Airport will gain based aircraft in the future.
- North American Flight Services is planning to expand its services. Their maintenance services are well known in the region and attract aircraft from the greater New York and New England areas. As there are no organized flight training services offered at the Airport today, the FBO is planning to offer flight training in the 2014/2015 timeframe. This training will add to both based aircraft and aircraft operations in the future.

These assumptions will be used to develop the forecasts of based aircraft and aircraft operations for Saratoga County Airport.

3.5 FORECASTING METHODOLOGIES CONSIDERED BUT NOT USED

The lack of historical data available for based aircraft and operations limited the effectiveness of developing a valid projection for the trend line and regression methodologies. These methodologies work best when there is reliable and abundant data to generate useful projections. The following sections summarize the findings.

3.5.1 Time Series/Trend Line Analysis

Time-series forecasting is a simple methodology that is effective when historical data has followed a relatively consistent pattern over a number of years. It assumes that past trends will continue into the future.

The available data for based aircraft and operations was limited. The only sources of data were information from the 1986 Master Plan, 2003 Master Plan and the current FAA 5010. Based aircraft have fluctuated between 1986 and 2012 and as such, does not generate a trend line with a high level of confidence.

A similar problem occurs with aircraft operations. Operations decreased between 1986 and 2003 and then remained flat. As such, the trend line analysis does not produce a useable trend line to project aircraft operations.

Findings and Summary

In order to achieve a high level of statistical confidence, trend line analysis is dependent on a consistent rate of change over a period of time. Given the fluctuations in based aircraft since 1986 and the overall decline in reported operations, fitting a forecast for either measure of Airport activity along long term trend line projections does not achieve a high level of confidence. Therefore, forecasts for based aircraft and operations utilizing time-series/trend line analysis were dismissed from further consideration.

3.5.2 Regression Analysis

Another forecast analysis methodology is a regression model, which attempts to find a mathematical relationship between historical factors at the Airport, such as operations or based aircraft (the “dependent” variable) and “independent” socio-economic and/or demographic variables. For Saratoga County Airport, this methodology considers the potential effect of outside factors as a coincident relationship (rather than a causal relationship) for changes in based aircraft and operations.

The availability of abundant data for population, employment and per capital income was limited to major years (i.e. 2000; 2010); intermediate year data was not available. Regression analysis requires extensive data in order to produce an effective analysis. For this reason, regression analysis was not considered a viable methodology to develop projections of based aircraft or aircraft operations for Saratoga County Airport.

3.6 FORECASTING METHODOLOGIES USED TO FORECAST AVIATION ACTIVITY

The Trend Line and Regression methodologies did not generate useful forecast of aviation activity. As a result, the Applied FAA Aerospace Forecast Growth Rates and Market Share Methodologies were used to forecast aviation activity at Saratoga County Airport. Each of the methodologies is discussed below followed by their respective forecasts of Based Aircraft and Operations.

3.6.1 Applied FAA Aerospace Forecast Growth Rates

The FAA prepares national forecasts of general aviation activity annually, with the most recent being *FAA Aerospace Forecast Fiscal Years 2013-2033*. The FAA's aviation forecasts are categorized by types of general aviation aircraft and year, and cover a broad range of measures of aviation activity and industry health.

The Aerospace Forecast is based on econometric models that are consistent with emerging trends and structural changes taking place within the aviation industry. Therefore, in spite of uncertainty as to the timing and relative strength of a recovery in aviation demand, the FAA Aerospace Forecast predicts continued growth in the U.S. economy throughout the forecast period.

For purposes of this forecasting effort, growth rates were extrapolated from the Aerospace Forecasts and applied to based aircraft and aircraft operations numbers to generate a forecast of activity. The analysis for based aircraft and aircraft operations is presented in the next section.



3.6.2 Market Share Analysis

Market share projections are based on the assumption that the amount of activity at an individual airport or region will change proportionally to that of a larger Region in which it is a part. This approach is a “top-down” methodology since forecasts of aggregated or high level measures are used as the basis for deriving their smaller component parts. Market share forecasts are developed by calculating the proportion of some aviation activity measure over time (the “market share”), and projecting either a static or dynamic share into the future. This method is an appropriate forecast model given that the FAA has forecasted, using reliable data, the activity at the National, Regional and New York State levels. Also, this model is applicable when the historic share of the airport to the larger aggregate exists and is relatively constant through the years, particularly the last 10 to 20 years.

For Saratoga County Airport, the market share analysis and projections utilized the FAA’s *Terminal Area Forecast Summary, Fiscal Years 2012-2040 (TAF)*. While the TAF provides airport forecasts primarily focused on commercial activity at core airports, also included are summaries for total operations and based aircraft by Region. Therefore, this FAA forecast is well suited for providing aggregate data from which market share estimates can be derived for Saratoga County Airport for the planning period.

The analysis using the market share approach for Based Aircraft and Aircraft Operations is presented in the next section.

3.7 BASED AIRCRAFT FORECAST

In order to project the number of based aircraft at Saratoga County Airport, the Applied FAA Aerospace Forecast Growth Rates and Market Share methodologies were applied to develop based aircraft projections. The following sections detail the analysis completed for each methodology.

3.7.1 FAA Aerospace Forecast Growth Rates

The FAA Aerospace Forecasts provided a discussion on future activity based upon five categories of aircraft: Single Engine, Multi-Engine, Turboprop, Jet and Helicopters. All are applicable to Saratoga County Airport.

The annual growth rates for each of these aircraft categories were defined in the document and are presented as follows:

- Single Engine: -0.2%
- Multi-Engine: -0.6%
- Helicopter: 3.0%
- Turboprop: 2.8%
- Jet: 3.5%

These growth rates were applied annually to the 2012 based aircraft categories presented in Table 3-2 and forecasted for the twenty-year planning period. They were then added together to generate the total number of based aircraft. The results are presented in Table 3-6.

Table 3-6 – Forecast of Based Aircraft, FAA National Growth Analysis

Year	Single Engine	Multi-Engine	Turbo-Prop	Jet	Rotor	Total
2012	39	5	3	2	1	50
2017	39	5	3	2	1	50
2022	38	5	5	3	1	51
2027	38	5	5	3	2	53
2032	37	4	6	4	2	54

Source: McFarland Johnson

The application of the FAA’s *Forecast* growth rates to existing based aircraft at Saratoga County Airport yields an increase of only four aircraft over the twenty-year planning period. This is primarily due to the loss of single and multi-engine aircraft over the twenty-year period and the small increases associated with turboprops, jets and helicopters.

3.7.2 Market Share Analysis Forecast

The TAF provides projections of based aircraft in Table 3-1 of the TAF document. The projections of based aircraft are presented at the National, FAA Eastern Region, and New York State levels.

Table 3-7 below presents the historical based aircraft for Saratoga County Airport and the TAF based aircraft at the National, FAA Eastern Region and New York State levels. The market share of Saratoga County Airport’s based aircraft to based aircraft in the National, FAA Eastern Region and New York categories were calculated and are shown in parentheses.

Table 3-7 – Market Share Percentages for Based Aircraft

Year	Saratoga County BA	National	Eastern Region	New York
1990	63	162,173 (0.039%)	16,519 (0.38 %)	5,040 (1.25%)
2000	58	179,740 (0.032%)	17,869 (0.33%)	4,960 (1.17%)
2012	48	163,351 (0.031%)	15,378 (0.33%)	4,266 (1.17%)

Source(s): FAA TAF Summary, FY 2012-2040 *TAF Base Year 2012.

Saratoga County Airport’s share of National, Regional, and Statewide based aircraft appears consistent, albeit declining at a low rate over the 20-year historical period.

To derive a projection of based aircraft for Saratoga County Airport, the respective 2012 market shares calculated for the National, FAA Eastern Region and New York State were applied to the TAF’s based aircraft projections for each category. The 2012 market share percentage for each category was held constant through the planning period. The resulting forecast of based aircraft is presented in Table 3-8.



Table 3-8 – Forecasts of Based Aircraft, TAF Market Share National, Region, & New York State

Year	National	Saratoga County	Eastern Region	Saratoga County	New York	Saratoga County
2012	163,351	50	15,378	50	4,266	50
2017	170,292	54	15,935	52	4,406	52
2022	177,734	54	16,572	54	4,569	54
2027	185,515	57	17,176	56	4,719	55
2032	193,531	59	17,791	58	4,872	57

Source: FAA TAF Summary, FY 2012-2040

The application of the FAA’s TAF to a market share forecast scenario at Saratoga County Airport yields a comparatively modest growth for each category through the planning period.

3.7.3 Preferred Based Aircraft Forecast

The resulting projections for the two forecast methodologies were reviewed to identify a preferred based aircraft forecast. The following paragraphs detail the assessment and Table 3-9 provides a summary comparison of the forecasts:

Table 3-9 – Summary of Based Aircraft Forecasts

Year	FAA Growth Rate Forecast	Market Share Forecast		
		National	Eastern Region	New York State
2012	50	50	50	50
2017	50	52	52	52
2022	51	54	54	54
2027	53	57	56	55
2032	54	59	58	57

Source: FAA TAF Summary, FY 2012-2040

The Applied FAA Aerospace Forecast analysis showed a small growth of only two aircraft over the twenty-year planning period. This was due to the loss in single and multi-engine aircraft being countered with the growth in turboprops, jets and helicopters. However, this is not a realistic forecast as the FBO is planning to expand its services, including a new flight school, which will add new based aircraft. Additionally, the FBO is also planning to add aircraft to their fleet, which will further increase based aircraft in the future.

The Market Share Forecast, on the other hand, assumed overall growth based on the regional market. Fluctuations in total based aircraft at the Airport over the historical period point toward local or regional competition that has either attracted single engine aircraft to base at Saratoga County in some years or drawn them away in other years. Such local market forces are not reasonably reflected in the forecast for the Applied FAA Aerospace Forecast methodology. Interestingly, the forecast results for the FAA Eastern Region and New York State are the same, while the National market share forecast is only slightly higher in the later portion of the planning period.



Based on the observations discussed above, the Regional Market Share Analysis methodology for New York State was selected as the preferred forecast of based aircraft for Saratoga County Airport. This forecast better projects the market forces noted above while also forecasting a modest growth in based aircraft at Saratoga County Airport.

3.7.4 Based Aircraft Fleet Mix Forecast

Using the preferred forecast of total based aircraft presented in Table 3-9 above, the next step was to examine the types of aircraft forecasted to be based at the airport. For purposes of this analysis, the 2012 percent of total based aircraft was calculated for each aircraft category: single engine 78%, multi-engine 10%, turboprop 6%, jet 4% and helicopter 2%. These percentages were reviewed to determine if these percentages should be adjusted.

The FAA Aerospace forecasts suggest that single and multi-engine aircraft will decrease over the next ten years, then start a slow growth while turboprop, jet and helicopters will increase, thus jets having the greatest level of growth at 3.5% annually. However, there are several factors, which suggest that the Airport could see a different growth pattern:

- The FBO is planning to become a Cessna authorized flight school. Thus, new single engine aircraft will be used for flights training. This suggests that single engine aircraft will not decrease over time as per the FAA aerospace forecasts, but will slowly increase over time as the flight school builds business.
- Multi-engine aircraft are expected to decrease, as most of these aircraft are privately owned. The flight school is expected to have one multi-engine aircraft, but this will not have a significant effect on the reduction of the privately owned aircraft. The Aerospace forecast, however, does suggest that multi-engine aircraft will see a slight growth beyond the 2022 timeframe.
- Turboprop aircraft are expected to remain steady as the FBO does not have plans to increase the number of turboprop aircraft used today.
- The FBO is replacing one of its two jets in 2014. However, the FBO is also planning on building a new hangar and as part of that development, expected to house a jet aircraft once the facility is built. As such, a new jet is expected to be based at the Airport by 2017. The mid and long term could see additional jets.
- Helicopter activity is not expected to significantly change as the current helicopter, which is based at Saratoga, is used primarily for training. Future growth, however, is not known at this time.

Based on the bulleted information above, slight adjustments were made to the percentages for multi-engine aircraft and jet aircraft. The share of multi-engine aircraft was reduced from 10% to 8% and jet was increased from 4% to 6%. The resulting fleet mix forecast is presented in Table 3-10.

Table 3-10 – Based Aircraft Fleet Mix Forecast

Year	SE	ME	Turbo	Jet	Helicopter	Total
2012	39	5	3	2	1	50
2017	41	4	3	3	1	52
2022	43	4	3	3	1	54
2027	44	5	3	3	1	56
2032	45	5	3	3	1	57

Source: McFarland Johnson

3.8 AIRCRAFT OPERATIONS FORECAST

The next forecasting step was to project the number of operations at Saratoga County Airport. As with the Based Aircraft Forecast, the forecast of aircraft operations for Saratoga County Airport focused on the Applied FAA Forecast Analysis Growth Rates and the Market Share Forecast analysis. The forecast analysis for each is presented in the following sections.

3.8.1 Applied FAA Aerospace Forecast Analysis

The FAA Aerospace Forecasts provide the starting point for a forecast of future demand at Saratoga County Airport. In this forecast, the FAA predicts that the general aviation hours flown will increase at 1.5% annually through the twenty-year planning period. The FAA projected that much of the growth in hours flown would be associated with turbine and helicopter activity.

Table 3-11 presents the forecast of operations by applying the 1.5% growth rate annually over the twenty-year planning period.

Table 3-11 – Forecast of General Aviation Operations, Applied FAA Aerospace Forecast

Year	Total
2012	38,550
2017	41,524
2022	44,728
2027	48,180
2032	51,898

Source: McFarland Johnson

3.8.2 Market Share Analysis Forecast

Similar to the market share analysis performed for based aircraft, a forecast of operations for Saratoga County Airport using this methodology is based on the assumption that the amount of activity at the Airport will change proportionally to that of New York State, the Eastern Region, or the Nation as a whole. Additionally, the market share analysis and projections of operations relies on the *FAA's Terminal Area Forecast Summary, Fiscal Years 2012-2040*.

For the 1990-2012 period, Saratoga County Airport accounted for the following market share percentages shown in Table 3-12.



Table 3-12 – Market Share Percentages for General Aviation Operations

Year	Saratoga County	National	Eastern Region	New York
1990	49,440	105,376,406 (0.047%)	13,877,281 (0.36%)	4,094,181 (1.21%)
2000	38,025	121,891,415 (0.031%)	14,488,267 (0.26%)	4,295,078 (0.89%)
2010	34,800	101,345,016 (0.034%)	11,531,856 (0.30%)	3,610,053 (0.96%)
2012	38,500	99,304,384 (0.039%)	11,169,965 (0.35%)	3,624,725 (1.06%)

Source: FAA TAF Summary, FY 2012-2040

Given the historical fluctuations, the 2012 share of Saratoga County Airport’s operations for the National, Eastern Region and New York State operations were used to derive the forecast for operations. The market share was held constant and applied to the TAF’s forecast of National, Eastern Region and New York Operations. The application of these market shares through the 2012-2032 forecast period yields the total general aviation operations at Saratoga County Airport shown in Table 3-13.

Table 3-13 – Forecast of General Aviation Operations, Market Share

Year	National	Saratoga County	Eastern Region	Saratoga County	New York	Saratoga County
2012	99,304,384	38,550	11,169,965	38,550	3,624,725	38,550
2017	101,541,051	39,418	11,395,395	39,328	3,617,226	38,470
2022	105,256,000	40,860	11,888,230	41,029	3,733,905	39,711
2027	109,044,766	42,331	12,392,400	42,769	3,851,754	40,965
2032	113,170,636	43,933	12,931,879	44,631	3,997,550	42,302

Source(s): FAA TAF Summary, FY 2012-2040, McFarland Johnson

3.8.3 Operations per Based Aircraft (OPBA)

As a check on the reasonableness of the Applied FAA Aerospace and Market Share Forecast analyses, the ratio of Operations per Based Aircraft (OPBA) was calculated for the historical period. The relationship of operations to based aircraft is shown in Table 3-14.

Table 3-14 – Operations per Based Aircraft (OPBA) (Historical)

Year	Total Operations	Based Aircraft	OPBA
1986	50,700	65	780
1995	39,357	46	856
1999	38,500	61	631
2005	36,600	60	610
2010	34,800	58	600
2012	38,550	50	771
AVERAGE	-	-	711

Source: McFarland Johnson

As shown in the table above, the historical OPBA average at Saratoga County Airport has fluctuated, ranging from 780 in 1986 to 711 in 2012 and dipping to 600 in 2010. The average during this period was 711.



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A review of FAA Order 5090-3C - *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)* presents some guidelines for typical OPBA values for different types of airports. They include 250 OPBA for rural airports, 350 for busier general aviation airports and 450 for busier reliever airports, The Order goes on to note that in certain circumstances where there is a high level of itinerant operations, the OPBA value can be 750. For Saratoga, this is the case with the extensive itinerant activity during the horse racing season. As shown above in Table 3-14, the OPBA values have ranged in the 600 to 700 ranges.

The OPBA for the Applied FAA Aerospace and Market Share Forecast analyses were calculated for the forecast years and are shown in Table 3-15.

Table 3-15 – Operations per Based Aircraft (OPBA), Forecast Comparison

Year	Market Share Forecast			Applied FAA Aerospace Forecast
	National	Eastern Region	New York State	
2012	711	711	711	711
2017	758	756	740	799
2022	757	760	735	828
2027	770	778	745	876
2032	771	783	742	910
AVERAGE	765	770	747	837

Source: McFarland Johnson

As shown in the table above, the average OPBA for the Market Share forecasts remain around the 750 OPBA number while the Applied FAA Aerospace Forecast methodology is in the low 800 range.

Preferred Forecast of Aircraft Operations

Table 3-16 summarizes the two sets of operations forecasts developed for this analysis.

Table 3-16 – Summary of General Aviation Operations Forecast

Year	Market Share Forecast			Applied FAA Aerospace Forecast
	National	Eastern Region	New York State	
2012	38,550	38,550	38,550	38,550
2017	39,418	39,328	38,470	41,524
2022	40,860	41,029	39,711	44,728
2027	42,331	42,769	40,965	48,180
2032	43,933	44,631	42,302	51,898

Source: McFarland Johnson

Given the findings of the OPBA analysis, the Market Share forecasts represent forecasts that are in line with FAA OPBA guidance whereas the Applied Aerospace Forecasts exceed the OPBA guidelines. Supporting this is that there are no known major airside or landside projects proposed at the surrounding regional airports that would influence a major change in activity at Saratoga County Airport.



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The recommended operations forecast selected for Saratoga County Airport is the New York Market Share Forecast. This forecast represents the more likely operational level as Saratoga County Airport. The share of operations in the region has remained steady as need in the fuel sales data presented earlier in this chapter and information provided by the Airport Manager, who indicated that competition among the regional airports has not influenced significant changes in operations.

3.8.4 TAF Comparison

FAA Order 5090.3C - *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)* provides a guideline to approve forecasts of aviation activity. The requirement states that the five-year projection be within 10% of the TAF forecast and 15% for the ten-year projection.

The TAF forecast for Saratoga County Airport is flat at 38,550 operations over the twenty-year period. As compared to FAA TAF, the operations forecast presented in Table 3-16 represents a slight decline of -0.2% over TAF levels in the five-year period and 3.0% higher in the ten-year period. Both of which are within the FAA's accepted range of 10% above the TAF for the five-year future and 15% for the ten-year future.

Table 3-17 - Comparison to TAF Operations Forecast

Year	TAF	Preferred	% Difference
2012	38,550	-	-
2017	38,550	38,470	- 0.2%
2022	38,550	39,711	+ 3.0%
2027	38,550	40,965	+6.3%
2032	38,550	42,302	+9.7%

Source: McFarland Johnson

3.8.5 Local and Itinerant Operations Forecast

Tables 3-3 and 3-5, presented earlier, provide the best data available regarding historic trends between local and itinerant operations at Saratoga County Airport. As a percentage of total operations, itinerant flights have ranged from 43 percent and 45 percent of total operations, with a slight decrease (-0.3 percent annually). Local operations have ranged from 55 percent to 57 percent, with a corresponding increase (0.3 percent annually) over the same period.

For purposes of this forecast, the 2012 FAA 5010 local and itinerant share of 57% and 43%, respectively, was used and held constant through the planning period. It should be noted that the itinerant operations, taken from the FAA 5010 Form, include military and air taxi operations. The resulting projection for Saratoga County Airport is shown in Table 3-18.

Table 3-18 – Forecast of Local & Itinerant Operations

Year	Total Operations	Local Operations	Itinerant Operations
2012	38,550	21,974	16,576
2017	38,470	21,928	16,542
2022	39,711	22,635	17,076
2027	40,965	23,350	17,615
2032	42,302	24,112	18,910

Source: McFarland Johnson

3.8.6 Operational Fleet Mix

Operational fleet mix breaks down the annual activity forecasts by the percentage of total operations of both based and itinerant aircraft that were generated by the various aircraft types, which is an important demand indicator. The 2012 fleet mix percentages were derived using information provided by the Airport Manager and information from Flightwise, which tracks aircraft operations. It should be noted that the Airport Manager defined the information for single and multi-engine data while the data from Flightwise identified the number of turboprop and jet aircraft. The operational breakdown is shown in Table 3-19.

Table 3-19 – Operational Fleet Mix Percentages

Aircraft Category	Example Aircraft	Fleet Mix Percentage
Single Engine (Piston)	Cessna 172 or Similar	93.5%
Multi-Engine (Piston)	Cessna 310, Piper Navajo	1.6%
Turboprop	Beech King Air, Pilatus PC12	1.7%
Jet	Cessna Citation, Dassault Falcon, Bombardier Learjet	2.4%
Helicopter	Robinson R-22, Sikorsky S-76	0.8%

Source: North American Flight Services, Inc. (FBO), Flightwise, McFarland Johnson Analysis

The fleet mix percentages in Table 3-18 were used to calculate the 2012 operations for each aircraft category, which were then projected into the future using the based aircraft forecasts and annual usage projections. In this way, an estimate of operational fleet mix was forecasted. The forecast of operational fleet mix for Saratoga County Airport is shown in Table 3-20.

Table 3-20 – 2012-2032 Operational Fleet Mix

Year	Single Engine	Multi-Engine	Turboprop	Jet	Rotor	Total
2012	36,045	617	646	930	312	38,550
2017	35,970	616	645	928	311	38,470
2022	37,131	636	665	958	321	39,711
2027	38,303	656	686	988	332	40,965
2032	39,553	677	709	1021	342	42,302

Source: McFarland Johnson



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3.8.7 Peak Operations

Since many of the Airport's facility needs are related to the levels of activity during peak periods, forecasts were developed for peak month, design day and design hour. Ideally, comprehensive historical data should be analyzed to determine the peaking characteristics. The most commonly used approach in developing these activity descriptors is based on the peak month, design day, peak hour methodology.

- Peak Month Operations: This level of activity is defined as the calendar month when peak aircraft operations occur.

For Saratoga County Airport, a non-towered facility, historical data regarding peak month operations was extrapolated from fuel sales data provided by the FBO for the 2009-2012 period. Based on this fuel sales data, the peak month at the Airport has been August, which is reasonable considering this coincides with the peak of Race Season. Peak activity estimates are shown in Table 3-21.

Table 3-21 – Peak Month & Percentage of Annual Activity, 2009-2012

Year	Total Operations	Peak Month	Peak Month Activity	Peak Month Percentage
2009	35,160	August	12,939	36.8%
2010	34,800	August	10,370	29.8%
2011	36,050	August	11,716	32.5%
2012	37,300	August	12,384	33.2%
AVERAGE	-	-	-	33.1%

Source: McFarland Johnson; Total Operations Extrapolated from Historical Operations Data

- Design Day Operations: This level of operations is defined as being ten percent busier than the average day within the peak month. This indicator is developed by dividing peak month operations by either 30 or 31 and then multiplying by 1.1. A 31-day peak month was assumed for design day operations at Saratoga County Airport, as per Table 3-19, the peak month was August.
- Peak Hour Operations: This level of operations is defined as the peak hour within the design day. Typically, these operations will range between 8 and 15 percent of the design day operations for airports with the activity profile similar to Saratoga County Airport. Because of the importance of having adequate facilities to serve peak hour demand, while not overbuilding, the midpoint of 11.5 percent was used to estimate peak hour operations.

Table 3-22 presents the forecasts of peak month, design day and peak hour operations based upon the above methodology. These forecasts can then be applied to determine the level of facility development necessary to maintain a reasonable level of service at Saratoga County Airport.

Table 3-22 – Forecast of Peak Activity

Year	Total Operations	Peak Month	Peak Day	Peak Hour
2012	38,550	12,747	452	52
2017	38,470	12,721	451	52
2022	39,711	13,131	466	54
2027	40,965	13,546	481	55
2032	42,302	13,988	496	57

Source: McFarland Johnson

3.8.8 Instrument Operations and Approaches

An instrument operation occurs when an aircraft departs from, or arrives at, an airport in accordance with an Instrument Flight Rules (IFR) flight plan, or the flight obtains IFR separation from terminal or air route traffic control centers. Instrument operations require a special instrument pilot rating, and most of the activity is associated with business flights or aircraft that fly at altitudes where IFR flight plans are required. Student training is also a source of instrument approaches during instrument flight training. Instrument approach counts can be underestimated as many instrument flight plans are terminated before the aircraft reaches the airport. This is often done when weather conditions allow the pilots to visually see the airport before they have to initiate the instrument approach. These cancellations do not show up in the annual count, which accounts for the large difference in instrument approach and operation counts at an airport.

Table 3-23 provides extrapolated historical data on the number of annual instrument approaches and itinerant operations at Saratoga County Airport. The relationship between instrument approaches and itinerant activity are typically most relevant when forecasting instrument operations at general aviation airports since the bulk of instrument flying is conducted during itinerant flights.

Table 3-23 – Historic Instrument Approaches & Operations

Year	Itinerant Operations	Instrument Approaches	Instrument Approaches % of Itinerant Operations
2008	16,025	1,296	8.1%
2009	15,862	1,416	8.9%
2010	15,700	1,481	9.4%
2011	16,002	1,162	7.3%
2012	16,550	1,064	6.5%

Source(s): FAA Air Traffic Activity Systems (ATADS); McFarland Johnson

As shown in the table above, instrument approach data for Saratoga County Airport indicates a steady decline during the 2008-2012 period, representing a decrease of approximately 5 percent annually.

While historic instrument approaches at Saratoga County Airport show a downward trend, fuel sales data provided by the FBO indicates that jet aircraft activity remains steady. Instrument approaches are conducted primarily by itinerant flights, and for the purposes of forecasting, the 2012 percentage of instrument operations per itinerant



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operation (6.5 percent) was used and held constant through the 2012-2032 forecast period. Table 3-24 presents the resulting forecast.

Table 3-24 – Forecast of Instrument Approaches

Year	Itinerant Operations	Instrument Approaches
2012	16,550	1,064
2017	16,542	1,075
2022	17,076	1,109
2027	17,615	1,144
2032	18,910	1,229

Source: McFarland Johnson

3.9 SUMMARY OF FORECASTS

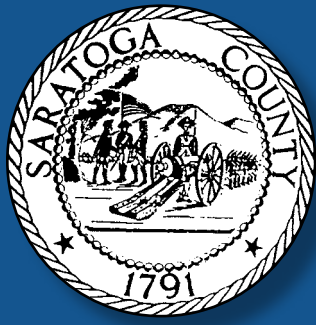
The recommended forecast for Based Aircraft and Operations was the New York State Market Share forecast. Table 3-25 summarizes the key forecasts developed for the recommended Based Aircraft and Operations forecasts for Saratoga County Airport.

Table 3-25 – Summary of Forecasts

Forecast	2012	2017	2022	2027	2032
Based Aircraft	50	52	54	55	57
Based Aircraft Fleet Mix					
Single Engine	39	41	43	44	45
Multi-Engine	5	4	4	5	5
Turboprop	3	3	3	3	3
Jet	2	3	3	3	3
Helicopter	1	1	1	1	1
Aircraft Operations	38,550	41,524	44,728	48,180	51,898
Aircraft Operations Fleet Mix					
Single Engine	36,045	35,970	37,131	38,303	39,553
Multi-Engine	617	616	636	656	677
Turboprop	646	645	665	686	709
Jet	930	928	958	988	1021
Helicopter	312	311	321	332	342
Aircraft Operations Split					
Local	21,974	21,928	22,635	23,350	24,112
Itinerant	16,576	16,542	17,076	17,615	18,910

Source: McFarland Johnson





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